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Factors Influencing the Adoption of Smartphones among Undergraduate Students in Ambrose Alli University, Ekpoma, Nigeria.

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FACTORS INFLUENCING THE ADOPTION OF SMARTPHONES BY UNDERGRADUATE STUDENTS AT AMBROSE ALLI UNIVERSITY, EKPOMA, NIGERIA

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ABSTRACT

Literature in Nigeria has thus far concentrated on the adoption of mobile technologies especially feature phones, hence, this paper deployed Rogers' innovation adoption theory to explain the factors that influence the adoption of smartphones among undergraduate students in Nigeria's first state-owned university, Ambrose Alli University, Ekpoma, using data collected from 226 students. The findings of this study reveal that, relative advantage and complexity were the only technological characteristics that explained adoption. Contrary to Rogers' theory, trialability, observability and compatibility with life style could not adequately predict adoption. In addition, socio-demographic characteristics could not sufficiently predict undergraduate students' smartphones adoption. For communication factors, except for interpersonal communication, mass media use did not have a significant relationship with adoption of the technology. This study is limited to respondents selected from one university using a questionnaire. Apart from providing policy information to the university who may also want to explore the implementation of mobile learning systems, the results may provide useful information to companies who design, produce and market smartphones on how to target the student communities in designing their products and services. Furthermore, it could be beneficial to mobile application developers who design applications for students.

Keywords: ***Smartphones, Innovations, Undergraduates. Ambrose Alli University, Nigeria***

INTRODUCTION

Smartphones can perhaps be considered as the most ubiquitous technology amongst the youth as it allows users to connect to one another socially. Aside voice calls and text messaging; it can be used for personal, educational, business, entertainment and a plethora of other purposes. One of the features that make smartphones very popular amongst youth is the inclusion of social media platforms such as Facebook, Youtube, Twitter, etc. As a consequence, users can take pictures with their built-in camera, record videos and share these with a variety of online social media applications without so much effort. Thus, this has become a symbol of expression amongst the youth.

Over the last few years, smartphones have brought about significant and unprecedented changes in the way humans interact and share information and the number of users worldwide has grown from close to 700million in 2012 to an estimated 1.75billion in 2014 (eMarketer, 2014) and these figures are expected to rise particularly in the Middle East and Africa. Gartner (2014) revealed that the sales of smartphones surpassed that of feature phones for the first time in 2013, signifying increased acceptance and use. Probably, this can be attributed to the gradual decline of smartphone prices and growth in market share. Interestingly in 2013, Samsung Electronics noted that Nigerians bought 41% of the entire smartphones sold in Africa, surpassing South Africa by 10% (Tell, 2013). Summarily, this acceptance and usage is predominant in youths who are less than 30years, work full time or are in school (OAfrica, 2013).

Defining a smartphone is somewhat problematic because a clear cut scientific or industry definition is hard to find but it has often been used as a general term for the kind of phone that has an independent operating system like a PC and could achieve wireless network access through mobile communications networks (Baike, 2013) as cited by Mei et al (2013). It can arguably be described as the converged ultimate in mobile consumer products. Beyond interpersonal communication and interaction among students, there are intrinsic factors that may influence them to adopt technology. For instance, students who often times leave home to attend schools elsewhere will need to communicate with parents, siblings, relatives and friends. Similarly, smartphones will presumably allow students have immediate access to information, communication applications, ability to shop online, mobile banking and entertainment.

However, studies that empirically determine how demographic characteristics of students, technological characteristics of smartphones and communication factors influence students' adoption of smartphones in Nigeria is generally sparse that is why this research will investigate this in Ambrose Alli University (AAU), Nigeria. This study is designed to understand how the demographic characteristics of the respondents, perceived characteristics of smartphones and communication channels influence undergraduate students' adoption of smartphones in AAU, Nigeria.

RESEARCH HYPOTHESES

This study is guided by three hypotheses:

1. There is no significant relationship between the demographic characteristics of the respondents and students' adoption of smartphones
2. There is no significant relationship between perceived characteristics of smartphones and students' adoption at Ambrose Alli University
3. There is no significant relationship between the influence of communication channels and students' adoption of smartphones.

EMPIRICAL STUDIES ON FACTORS INFLUENCING SMARTPHONE ADOPTION

Demographic characteristics refer to the personal characteristics such as age, gender, sex, study level, religion, ethnic group, etc of the smartphone user. Many studies have shown that gender plays an important role in technology adoption (Gefen & Straub, 1997; Morris & Venkatesh, 2000). When men decide to use a technology, their decision is often strongly influenced by the perceived usefulness of the technology in comparison with others, while ease of use is the major variable influencing women's decisions. Wei and Zhang (2008) just like Nwagwu and Odetumibi (2011) also found that age, gender, level of study influence technology adoption. Pew Internet (2014), reported that smartphone adoption differed greatly across gender and age groups, and surprisingly, with high diffusion among older age groups.

Peters (2007) showed that psychological perspective in mobile communication technology is generally concerned with people's perceptions, expectations and attitudes. Wei & Zhang (2008) classified psychological factors into perceived characteristics, perceived popularity and perceived need. But this study is only interested in perceived characteristics and communication channels.

Communication encompasses creating and sharing information in order to reach a mutual understanding about an issue. Rogers (1995) classified communication channels into two, namely; mass media and interpersonal communication. Mass media such as radios, television sets and newspapers help people to have information about a new technology. Mass media may play an important role in the persuasion and decision making stage about whether or not to adopt a new technology, but physically interacting and receiving people's testimonies about a technology may make the adoption faster (Nwagwu, 2007). This is very important because people need both factual and attitudinal information to reduce the uncertainty about a new idea. On the other hand, interpersonal channels are more powerful to create or change strong attitudes held by an individual. Supporting this view, Putzer & Park (2010) revealed that social interactions affect the acceptance of mobile wireless technologies.

Before the innovation adoption theory of Rogers (1983), Tornatzky & Klein (1982) in a Meta analysis of characteristics of innovation had found only relative advantage, compatibility and complexity to be consistently related to adoption decisions. Several studies have been undertaken to examine the factors that influence smartphone adoption among young people. **Mokoena (2012)** carried out a study to determine if there was a significant association between students' opinion regarding mobile phone as a useful tool for learning, the type of mobile phones and the gender of the students. The findings revealed that students considered their mobile phones as useful tools for learning regardless of their mobile phone type and gender. Similarly, the study of Hong et al (2008) on the acceptance of smartphones by younger consumers in Malaysia showed that perceived usefulness, perceived ease of use and internet self-efficacy significantly influenced smartphone adoption.

Putzer & Park (2010) indicated that behavioural intention to use a smartphone was largely influenced by perceived usefulness and attitude towards using a smartphone. Compatibility, observability and compatibility has a positive effect and were significant predictors of users' intention towards using a smartphone. Age was not associated with smartphone adoption in South Africa (Nainkin, 2014). A study carried out by Al-Jabri & Sohail (2012) revealed that relative advantage, compatibility, and observability were positive and significant predictors of the use of mobile banking adoption in Saudi Arabia. In the same study, complexity and trialability did not have a significant effect.

THEORETICAL FRAMEWORK

Rogers' (1983) innovation diffusion theory formalizes the series of events that occur as individuals move beyond basic knowledge of a technology and decide whether the technology is favourable or unfavourable, and then decide whether or not to adopt the technology. When people adopt the technology and start using it, they may seek reinforcement of their adoption decision to adopt or may change their minds about the innovation. The major elements in Roger's theory are innovation and communication channels as well as time and social systems. Generally, an innovation could be conceived of as an idea, practice, or object that is perceived as new by an individual or any other unit of adoption. Rogers (1983) considered five attributes: (i) relative advantage (ii) complexity (iii) compatibility, (iv) trialability and (v) observability of an innovation which influence its adoption.

Relative advantage is the degree to which an innovation is perceived as better than the innovation it supersedes. According to Rogers, people who are planning to adopt new technology often want to understand whether the new idea is better than the old one. Rogers, also posited that adopters consider the complexity of a technology. They want to know whether the technology is more difficult to understand and use than an existing one. He suggested that when a technology is considered complex to use, adoption of the technology will be hampered.

Furthermore, trialability is concerned with whether a potential adopter can try or experiment with a new idea in order to develop an opinion about the idea. When people have tried out an idea, they are most likely to decide whether or not to adopt the idea more rapidly than others. Rogers also suggested that people will adopt an idea if the result of adoption by others is observable. The more observable an innovation is, the faster the adoption of the innovation will likely be. Hence, Rogers suggested a positive relationship between observability and adoption rate.

A communication channel is technology through which individuals pass messages to one another. Rogers classified communication channels into two, namely mass media and interpersonal communication and he went further to explain that this could influence technology adoption.

RESEARCH METHODOLOGY

The study focused on undergraduate students of Ambrose Alli University, Ekpoma, Nigeria's first state-owned university and it was guided by a sample survey design. The researchers adopted the proportionate to size sampling technique after six faculties out of the eleven faculties were randomly selected. Each of the students was given a copy of the questionnaire in each of the selected faculty. Departmental representatives were used to retrieve the questionnaire, thereby leading to a high return rate. Out of the 250 copies of the questionnaire distributed, 243 copies were completed and returned. 17 copies of the returned questionnaire were considered unusable because either there was no response to some questions asked or the respondents ticked multiple responses where they would have ticked one. Hence, a total of 226 copies were analyzed.

MEASURES AND DATA ANALYSES

The demographic, perceived characteristics and communication factors were the independent variables while the adoption of smartphone; Do you have a smartphone? Measured on a dichotomous scale of yes or no was the dependent variable. Next for the purpose of ease of understanding, the perceived characteristics of smartphones and communication factors were

recoded as (1=strongly agree) + 2(agree) as (1=agree), (3=do not know) as (2=do not know) and (4= disagree) and (5=strongly disagree) as (3=disagree).

Next, principal component analysis (PCA) was used to assess the underlying structure of the 20 perceived characteristics of smartphones which were grouped into five factors namely; relative advantage of smartphones, complexity of smartphones, trialability of smartphones, observability of smartphones and compatibility of smartphones with lifestyle. PCA was also used to access the communication factors that influence technology adoption. These were grouped into two factors; mass media influence and interpersonal communication. Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were used to establish whether there existed a sufficient number of items for the analysis and to find out if the correlation matrix that would result from the analysis was not an identity matrix. The acceptable Kaiser-Meyer-Olkin Measure value is usually greater than 0.60 while the significance value of its Chi Squared process should be less than 0.06 (Pallant, 2007). To test the hypotheses, perceived characteristics of smartphones and communication factors were operationalised by computing the components that were extracted in the PCA. Acquisition of a smartphone was accepted as a proxy for adoption. Functional relationship was examined using regression analysis.

FINDINGS

TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

Variables	Measurement	Frequencies	Percentage
Age	16-20	87	38.5
	21-25	118	52.5
	Above 25	21	9.3
Gender	Male	86	38.1
	Female	140	61.9
Level of Study	100level	80	35.4
	200 level	66	29.2
	300 level	26	11.5
	400 level	43	19.0
	Others	11	4.9
Occupation of father	Self-employed	83	36.7
	Private Sector	49	21.7
	Public sector	66	29.2
	Unemployed	28	12.4
Occupation of mother	Self-employed	128	56.6
	Private sector	40	17.7
	Public sector	54	23.9
	Unemployed	4	1.8
Type of Residence	Living in the hostel	65	28.8
	Living off campus (on my own)	142	62.8
	Living off campus (with parents)	19	8.4

Table 1 presents the socio-demographic characteristics of the respondents. The majority of the respondents were aged 25 years and below. The majority of the respondents were females and first year students formed the bulk of the respondents. The fathers of approximately 37% of the respondents were self-employed, 22% of them work in the private sector while 29% are in the public sector. A large percentage of the respondents (62.8%) live off campus; on their own.

PERCEIVED CHARACTERISTICS OF SMARTPHONES

The technology characteristics of smartphones examined are the perceived characteristics of smartphones and communication factors.

I. Perceived technology characteristics of smartphones

The first element in this category is relative advantage consisting of ease of availability and whether the technology is perceived as cheap, safe and easy to use. Most of the respondents (77.9%) agreed that smartphones are easily available but only 38.9% considered it as cheap. Also, 64.5% and 71.7% considered smartphones as easy and safe to use respectively.

The next element is complexity of smartphones in which 43.4% agreed that it was difficult for them to understand how to use it even though 88.9% of them agreed they can operate smartphones on their own. Trialability of smartphone is the next element. 87.2% of the respondents agreed that it was easier to use a smartphone after trying it out, 75.7% of them suggested that it was better for them to test the technology before buying one but about 53.5% did not consider it necessary to try a smartphone before buying one.

For observability, 62.8% reported that they were not influenced by others to buy a smartphone but 81% were influenced to buy a smartphone based on their observation. Also, 85% were satisfied with the results of using the technology while 85.4% agreed a smartphone is worth its value. Furthermore, for compatibility, 82.3% were of the opinion that it fits their social life, 88.9% said they enjoyed using a smartphone while 58% of them disagreed that they use the technology because of its shape and brand name. Also, 73.5% agreed they were interested in smartphones because of its durability. Similarly, 54.4% suggested that it helped them manage their time while 83.6% agreed that the technology fits into their academics.

II. Communication Factors

The use of modern ICTs and mass media are complementary. This is why this paper examined how mass media and interpersonal communication influence smartphone adoption. it revealed that 55.8% were influenced to adopt the technology based on newspaper reports, 47.8% were influenced by radio, 65.9% were influenced by listening to/watching television while 89.8% were influenced by the internet to adopt the technology.

In addition, on the influence of interpersonal communication, it was revealed that 92.9% use smartphone because of the need to communicate with family members, 90.7% agreed that the need to interact with friends influenced them, interaction with community members accounted for 57.1% and the general population made up 80.1%

OWNERSHIP OF A SMARTPHONE

Most of the respondents (50.9%) have one smartphone; 24.8% have two smartphones, 3.1% reported that they have more than two smartphones while 21.2% admitted they do not have any smartphone.

FURTHER STATISTICAL ANALYSIS

PCA was used to reduce the 20 perceived characteristics of smartphones and 8 communication factors that can influence smartphone adoption.

THE STRUCTURE OF PERCEIVED CHARACTERISTICS IN SMARTPHONE ADOPTION

Table 2 shows the structure of perceived characteristics of smartphone adoption. The first factor, relative advantage consists of ease of availability, cheapness, safety of the technology and ease of use. Cheapness of the technology had the highest mean score (3.17) and the highest deviation from the mean (1.37); while safety of the technology explained 50% of the variation in the factor. The second factor, complexity of smartphones consists of difficulty in using smartphones and operating smartphones on one's own. In this category, difficulty in using smartphones has the highest mean score (3.02) and explained 59% of the variation in the factor. For trialability, the time it takes to try a smartphone before agreeing to buy one has the highest mean score (3.19) compared to other factors in this group, however, time it takes before accepting to buy a smartphone and the ease of use of smartphone after trying them out gave cumulative Eigenvalues of 75.74%, indicating that these two components sufficiently absorb the variation of trialability of smartphones. For observability, the influence by others to buy a smartphone and the opinion that smartphone is worth its value explain 80.01% of the variation. Regarding compatibility with one's social life, use of smartphone because of its shape/look, smartphone use because of its brand name as well as smartphones helping to save time explains 68.98% of the total variation.

TABLE 2: PERCEIVED CHARACTERISTICS OF SMARTPHONE ADOPTION

Perceived characteristics of smartphone	Mean	Standard deviation	1	2	3	4	5
Relative advantage							
Smartphones are easily available	2.09	1.01	0.24				
Smartphones are cheaper	3.17	1.37	0.55				
Smartphones are safer	2.40	1.13	0.63				
Smartphones are easy to use	2.31	1.17	0.58				
Complexity							
It is difficult to understand how to use smartphones	3.02	1.19		0.59			
I operate smartphones on my own	1.81	0.89		0.59			
Trialability							
Easier to use smartphone after trying one	1.84	0.84			0.78		
Better to test smartphones to see what they can do before buying one	2.12	1.07			0.68		
It took time before accepting to buy a smartphone	3.19	1.22			0.81		
Observability							
Influenced by others to buy a smartphone	3.38	1.34				0.97	
Influenced to buy a smartphone by observing its benefits	2.04	1.11				0.71	
Satisfied with the results of using smartphones	1.79	0.90				0.76	
Smartphone is worth its value	1.80	0.99				0.77	
Compatibility							
Smartphones fit my social life	1.88	1.03					0.64
I enjoy using smartphones because of its applications	1.70	0.88					0.73
I use smartphone because of its	3.24	1.29					0.79

shape/look							
I use smartphone because of brand name	3.29	1.28					0.78
Interested in the durability of smartphones	2.16	1.07					0.49
Using smartphones has helped me to manage time	2.77	1.27					0.75
Smartphone fits into my academics	1.94	1.01					0.64
Percent of Variance Explained			**50.18**	**59.44**	**75.74**	**80.01**	**68.98**
KMO and Bartlett's test (sig. level)			**0.00**	**0.004**	**0.002**	**0.00**	**0.00**

TABLE 3: INFLUENCE OF COMMUNICATION FACTORS ON SMARTPHONE ADOPTION

Factors	**Mean**	**Standard deviation**	**1**	**2**
Mass media				
Newspaper report influenced my adoption	2.65	1.22	0.51	
Listening to radio influenced my adoption	2.83	1.21	0.67	
Television influenced my adoption	2.38	1.15	0.70	
Internet browsing influenced my adoption	1.69	0.93	0.13	
Interpersonal Communication				
Interaction with family members	1.16	0.78		0.43
Interaction with friends	1.70	0.84		0.66
Interaction with community members	2.56	1.21		0.50
Interaction with the general population	2.03	2.03		0.62
Percent of Variance Explained			**50.01**	**55.12**
KMO and Bartlett's test (sig. level)			**0.00**	**0.00**

THE STRUCTURE OF COMMUNICATION FACTORS ON SMARTPHONE ADOPTION

Table 3 contains the structure of communication factors consisting of mass media and interpersonal communication influence on smartphone adoption. The first factor, mass media consist of influence of newspaper on smartphone adoption, the influence of listening to radio, listening to/watching television and internet browsing. Within this group, listening to radio has the highest mean score (2.83). The first factor was loaded on listening to/watching television, which accounted for 50.01% of the total variation.

The next factor, interpersonal communication, consists of interaction with family members, interaction with friends, interaction with community members and interaction with people in the general population. In this group, interaction with community members has the highest mean score (2.56). Further, the factor was loaded on interaction with friends which accounted for 55.12% of the total variation.

TESTING THE HYPOTHESES

The extracted factors were recomputed to describe relative advantage, complexity, trialability, observability and compatibility of smartphones. The same computation was done for mass media and interpersonal communication. These new variables and the demographic

characteristics constituted the independent variables whose influence on technology adoption was investigated using a regression analysis.

HYPOTHESIS ONE

There is no significant relationship between the demographic characteristics of the respondents and the adoption of smartphones among students in Ambrose Alli University. Table 4 shows that there was no significant relationship between age of the respondents, gender, and level of study and smartphone adoption. With reference to the occupation of parents and the living type, there was no significant relationship that influenced smartphone adoption.

TABLE 4: RELATIONSHIP BETWEEN DEMOGRAPHIC FACTORS AND ADOPTION OF SMARTPHONES

Demographics	Beta	B	Sig. Level
Age of Respondents	-0.095	-0.062	0.246
Gender	0.044	0.037	0.520
Level of Study	-0.015	-0.005	0.854
Occupation of Father	0.097	0.038	0.161
Occupation of Mother	0.001	0.000	0.990
Living Type	0.091	0.065	0.174

HYPOTHESIS TWO

There is no significant relationship between the perceived characteristics of smartphones and its adoption. Table 4 shows that for the relationship between adoption of smartphones and characteristics of the technology, only relative advantage ($B=0.018$, $p<0.05$) and complexity ($B= 0.047$ and $p<0.05$) had a significant relationship. Trialabiliity, observability and compatibility did not have any significant relationship with whether the students would embrace the technology or not as the p-value is greater than 0.05.

TABLE 5: RELATIONSHIP BETWEEN ADOPTION OF SMARTPHONES AND PERCEIVED CHARACTERISTICS

	Beta	B	Sig. Level
Perceived Characteristics			
Relative Advantage of Smartphone	0.146	0.018	0.039
Complexity of Smartphones	0.154	0.047	0.026
Trialability of Smartphones	0.063	0.013	0.388
Observability of Smartphones	-0.026	-0.004	0.729
Compatibility of Smartphones	0.001	0.015	0.864

HYPOTHESES THREE

There is no significant relationship between communication factors and students' adoption of smartphones.

For communication variables, which includes mass media and interpersonal communication influence, mass media although has a positive correlation but it was not significant. Hence, it can be concluded that mass media did not influence students' smartphone adoption. Also, interpersonal communication shows a positive and significant slope ($B= 0.086$; $p<0.05$) with the adoption of smartphones, with the resultant acceptance of the alternate hypothesis.

TABLE 6: REGRESSION ANALYSIS BETWEEN ADOPTION OF SMARTPHONES AND COMMUNICATION FACTORS

	Beta	B	Sig. Level
Communication Factors			
Mass media use influence on smartphone adoption	0.011	0.004	0.883
Interpersonal communication influence on smartphone adoption	0.175	0.086	0.021

DISCUSSION

This study confirms that smartphones are becoming ubiquitous amongst students and entrenched in their daily activities as almost everyone surveyed has at least one, confirming a cursory observation that ease of availability and ease of use of smartphones are the major relative advantage variables proffered by about seven out of every ten students. Even though smartphones are ubiquitous, most of the students still perceive the technology as expensive but surprisingly, this has not been a major constraint for them to adopt one perhaps because it has become an object of social prestige amongst youth.

Respondents in this study are mainly young people who are 25 years and below, who are technology savvy, and who could spare time to learn to use complex functions on their smartphones. This is one of the reasons complexity of the technology did not seem to be a problem for the students as most of them operated the technology on their own. The natural expectation that one should try the technology before buying it was mentioned by about seven out of ten students. For most students, smartphone is worth its value and they are also satisfied with the benefits they derive from using the technology. The adoption of the technology by students was not influenced by the mass media even though about 8 out of 10 students confirmed that they were influenced by internet browsing to adopt the technology. This may be attributed to increased online advertising and the need to stay connected to the internet at all times. The need to stay connected with family members and friends influenced about 9 out of 10 students to adopt smartphones. Also, interpersonal communication influenced the adoption of smartphones by students. Of all the perceived characteristics, trialability, observability and compatibility could not significantly predict adoption.

The finding of an insignificant relationship between the demographic characteristics and students' adoption of smartphones was in line with the empirical result of Putzer & Park (2010) who found out that there was no significant relationship between the demographic characteristics and adoption of smartphones by Nurses in community hospitals in USA. Nainkin (2014) revealed that age was not associated with smartphone adoption in South Africa. However, this was not consistent with the findings of Leung (2007), Wei & Zhang (2008) and Nwagwu & Odetumibi (2011). Rogers (1995) suggested that demographic characteristics of individuals influence their adoption of new technologies. Also, Morris & Venkatesh (2000) observed that gender plays an important role in technology adoption which also deviates from the result of this finding.

The result of a positive and significant relationship between relative advantage and complexity agrees with the findings of Al-Jabri & Sohail (2012), Nwagwu & Odetumibi (2011), Putzer & Park (2010). Compatibility, observability and Trialability were found to be an insignificant predictor of smartphone adoption by undergraduate students. This also deviates from Putzer and Park (2010), Nwagwu and Odetumibi (2011) but Al-Jabri and Sohail (2012) reported an insignificant relationship between complexity and trialability of mobile banking

adoption in Saudi Arabia. Khan and Hyunwoo (2009) found that many customers perceive that smartphones are quite complex to use and difficult to understand.

The result of this analysis shows that while there was no significant relationship between mass media use, a positive and significant relationship was reported about interpersonal communication. This agrees with Mark and Poltrock (2001) who noted that it is possible for many individuals to initially hear about an innovation through mass communication channels, but, interpersonal communication influence adoption decision more. This corroborates the argument of Rogers (1995) in his theory.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study have important implications for policymakers in universities, mobile application developers and technology adoption researchers. This study reveals a valuable adoption of the innovation constructs specifically with respect to the acceptance of a smartphone by undergraduate students. Smartphones have the capability of providing instant information access to undergraduate students because they merge and integrate multiple and varied technological functions into a single device that is both versatile and portable. Also, in Nigeria, the cost of internet access is still high when compared to other countries and this could be an impediment to adopt the technology. Nevertheless, our study provided empirical support that the technological characteristics of relative advantage and complexity, then interpersonal communication influence undergraduate students in Ambrose Alli University, to adopt a smartphone.

The recommendations arising from this study are given below:

1. Since demographic characteristics has no influence on students' adoption of smartphones in Ambrose Alli University, factors like gender and ages of target buyers should not be considered before designing smartphones
2. Since the rate of adoption is high amongst undergraduate students in Ambrose Alli University, producers should incorporate mobile learning applications so as to promote mobile learning among undergraduates in tertiary institutions in Nigeria
3. Smartphone producers need to strategically use mass media to market their products to target buyers.

SCOPE FOR FURTHER RESEARCH

This research, similar to other empirical studies, was not without limitations. The result of this study is limited by our small sample size. Second, our study was conducted in one geographical area within the context of higher education institution. It is possible that factors that influence smartphone adoption may differ in other geographical regions due to a number of reasons. Thus, additional research on a broader geographical scale with a larger sample size is warranted. Taking cognizance that Nigeria is a developing country where electricity is still irregular, it becomes pertinent to include how battery life can influence smartphone adoption as a variable in future studies.

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